



5.2 IDENTIFICATION OF HAZARDS OF CONCERN

To provide a strong foundation for mitigation strategies considered in Section 6, Morris County considered a full range of natural hazards that could impact the area, and then identified and ranked those hazards that presented the greatest concern. The natural hazard of concern identification process incorporated input from the County and participating jurisdictions; review of the State of New Jersey Hazard Mitigation Plan (NJ HMP) and previous hazard identification efforts; research and local, state, and federal information on the frequency, magnitude, and costs associated with the various hazards that have previously, or could feasibly, impact the region; and qualitative or anecdotal information regarding natural hazards and the perceived vulnerability of the study area's assets to them. Table 5.2-1 documents the process of identifying the natural hazards of concern for further profiling and evaluation.

Hazards of Concern are defined as those hazards that are considered most likely to impact a community. These are identified using available data and local knowledge.

For the purposes of this planning effort, the Steering and Planning Committees chose to group some natural hazards together, based on the similarity of hazard events, their typical concurrence or their impacts, consideration of how hazards have been grouped in Federal Emergency Management Agency (FEMA) guidance documents (FEMA 386-1, "Understanding Your Risks, Identifying Hazards and Estimating Losses; FEMA's "Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy"), and consideration of hazard grouping in the NJ HMP.

The "Flood" hazard includes riverine (inland) flooding. Other types of flooding that can occur in the County include coastal and storm surge, which is further discussed in in Section 5.4.7 (Severe Weather) and flooding from dam failures which is further discussed in Section 5.4.1 (Dam Failure). Inclusion of the various forms of flooding under a general "Flood" hazard is consistent with that used in FEMA's "Multi-Hazard Identification and Risk Assessment" guidance.

The "Severe Weather" hazard includes windstorms that often entail a variety of other influencing weather conditions including thunderstorms, hail, lightning, and tornadoes. Since tropical disturbances are identified as a type of severe storm event, this hazard also includes tropical cyclone events (hurricanes, tropical storms, and tropical depressions). Tropical cyclones were not grouped as a separate hazard because the County felt that these types of events do not directly impact the County on a frequent basis and that exposure and risk of such events are minimal in comparison to communities along coastline of New Jersey.

The "Severe Winter Weather" hazard includes heavy snowfall, blizzards, freezing rain/sleet, ice storms, and extra-tropical cyclones (Nor'Easters and severe winter low-pressure systems). Extra-tropical events generally occur during winter weather months; therefore, for the purpose of this HMP, all such events are to be grouped within this hazard.

Please note that technological [e.g. hazardous material incidents] and man-made hazards (e.g. disease outbreak and infestation) are being addressed in this planning process. However, the DMA 2000 regulations do not require consideration of such hazards. The County and Planning Committee chose to include these hazards in the 2015 Plan Update.



Table 5.2-1– Identification of Natural Hazards of Concern for Morris County

Hazard	Is this a hazard that may occur in Morris County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Avalanche	No	No	<ul style="list-style-type: none"> The NJ HMP does not identify avalanche as a hazard of concern for New Jersey. The topography and climate of Morris County does not support the occurrence of an avalanche event. New Jersey in general has a very low occurrence of avalanche events based on statistics provided by the American Avalanche Association (AAA) between 1950 and 2014. 	<ul style="list-style-type: none"> NJ HMP Review of NAC-AAA database between 1998 and 2014. Steering and Planning Committee Input
Coastal Erosion	No	No	<ul style="list-style-type: none"> The NJ HMP identifies coastal erosion as a hazard of concern for New Jersey. Counties bounded by coastal waters are most affected by coastal erosion. Morris County is not bounded by coastal waters or contain any tidally influenced bodies of water. Based on the inland location of the County and input from the Steering and Planning Committees, coastal erosion is not a hazard of concern for Morris County. 	<ul style="list-style-type: none"> NJ HMP NOAA NJDEP Steering and Planning Committee Input
Coastal Storm	Yes	Yes	<ul style="list-style-type: none"> The NJHMP identifies coastal storms as a hazard of concern for New Jersey. For the purpose of this planning process, coastal storms will be included in Severe Weather. Please see 'Severe Weather' for information regarding hurricanes and tropical storms in Morris County. 	
Dam Failure	Yes	Yes	Please see Flood	
Drought	Yes	Yes	<ul style="list-style-type: none"> The NJ HMP identifies drought as a hazard of concern for New Jersey. According to the NJHMP, counties most often affected by a drought are densely populated areas that rely on above-ground reservoirs for water supplies. Morris County fits into this description. The drought hazard is a concern for Morris County because the County's water is supplied by both surface water and groundwater. Surface water supplies are affected more quickly during droughts than groundwater sources. According to FEMA, between 1954 and 2015, New Jersey was included in two declarations for drought-related events and Morris County was one of the designated counties in the declaration: <ul style="list-style-type: none"> FEMA-DR-205 (August 1965) FEMA-EM-3083 (October 1980) The NOAA-NCDC storm events databased indicated that between 2010 and 2014, Morris County had three drought events, all occurred between August and October 2010. There were no reported losses associated with these events. Morris County is located in the Northern Climate Division. According to the NRCC, this climate division has been impacted by the following periods of severe 	<ul style="list-style-type: none"> NJ HMP USGS NRCC NOAA NOAA-NCDC Storm Database Steering and Planning Committee Input



Section 5.2: Identification of Hazards Of Concern

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			<p>and extreme drought:</p> <ul style="list-style-type: none"> ○ August – September 1932 ○ November 1949 – January 1950 ○ September – November 1957 ○ August 1964 – August 1966 ○ December 1980 – January 1981 ○ March – April 1985 ○ August – September 1995 ○ July – August 1999 ○ December 2001 – May 2002 ○ July – September 2002 <ul style="list-style-type: none"> • Based on input from the Steering and Planning Committees, drought is an identified hazard of concern for Morris County. 	
Earthquake	Yes	No	<ul style="list-style-type: none"> • The NJ HMP identifies earthquake as a hazard of concern for New Jersey. Although they are known to occur on a regular basis, records indicate that no major earthquakes have struck the state since the establishment of historical record-keeping (1500's). Between 1783 and 2015, there have been 187 documented earthquakes in New Jersey. Fifty-one of these events have been epicentered in Morris County. • Based on input from the Steering and Planning Committees, earthquake is an identified hazard of concern for Morris County. 	<ul style="list-style-type: none"> • NJ HMP • NJDEP • NJGS • Steering and Planning Committee Input
Expansive Soils	No	No	<ul style="list-style-type: none"> • The NJ HMP does identify expansive soils as a hazard of concern for New Jersey; however, the Steering and Planning Committees did not identify this as a hazard of concern for Morris County. • USGS indicated that soils in Morris County either contain little to no swelling clay or typically have less than 50% of soils consisting of clay that has slight to moderate swelling potential. • Based on input from the Steering and Planning Committees, expansive soils is not an identified hazard of concern for Morris County. 	<ul style="list-style-type: none"> • NJ HMP • USGS 1989 Swelling Clays Map of the Conterminous U.S. • Steering and Planning Committee Input
Extreme Temperature	Yes	Yes	<ul style="list-style-type: none"> • The NJ HMP identifies extreme temperature as a hazard of concern for New Jersey. • Morris County averages between 10 and 18 days each year with temperatures above 90°F and between an average of 43 and 60 days below 20°F. • The highest temperatures recorded in Morris County were collected in 2011 and 2012: <ul style="list-style-type: none"> ○ Boonton - 102°F (July 8, 2012) ○ Chatham – 104°F (July 19, 2012) 	<ul style="list-style-type: none"> • NJ HMP • NOAA – NCDC Storm Database • Utah Climate Center • ONJSC • Steering and Planning Committee Input



Section 5.2: Identification of Hazards Of Concern

Hazard	Is this a hazard that may occur in Morris County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
			<ul style="list-style-type: none"> ○ Pottersville (Washington Township) - 102°F (July 23, 2011) • The NOAA-NCDC storm event database indicated that between 2010 and 2015, Morris County had 17 reported extreme temperature events; with a majority of them identified as excessive heat events. • Based on input from the Steering and Planning Committees and the history of extreme temperature events, extreme temperatures is an identified hazard of concern for Morris County. 	
Flood (Riverine)	Yes	Yes	<ul style="list-style-type: none"> • NJHMP identifies flooding as a hazard of concern in New Jersey. Based on historic events and location of floodprone areas within Morris County, the Steering and Planning Committees identified flooding as a hazard of concern for the County. • The western border of the County is located in the 1% annual chance flood zone. There are other small areas located within this flood zone as well and found throughout the County. Additionally, 0.2% annual chance flood zones are located around the County as well. Over 13% of the County is located within the 1% annual chance flood zone and over 14% is located within the 0.2% chance flood zone. • Morris County has 4,547 NFIP policies (as of September 30, 2014) with total loss payments exceeding \$188 million. There 283 severe repetitive loss properties in the County. • Areas prone to flooding in the County include those municipalities located near the Passaic and Pompton Rivers and the Pequannock River. • Between 2010 and 2015, Morris County was included in two FEMA declarations related to flooding: <ul style="list-style-type: none"> ○ March 12-April 15, 2010 – FEMA-DR-1897 - Severe Weathers and Flooding ○ August 26-September 5, 2011 – FEMA-DR-4021 – Hurricane Irene • According to NOAA NCDC storm database, Morris County had 42 flood events reported between 2010 and 2015. 	<ul style="list-style-type: none"> • NJ HMP • FEMA • FEMA FIS • NFIP • NOAA-NCDC Storm Database • Steering and Planning Committee Input
Geological Hazards	Yes	Yes	<ul style="list-style-type: none"> • The NJHMP identifies geological hazards (landslides and subsidence/sinkholes) as a hazard of concern for New Jersey. For the 2015 Plan Update, the Steering and Planning Committees identified landslides and land subsidence as hazards of concern for Morris County. • A majority of the County does not have landslide susceptibility. There are small areas in the northern and central portions of the County that are susceptible to landslide events (Class A and B). However, only 1% of the County is located within Class A areas and 1.4% located within Class B areas. 	<ul style="list-style-type: none"> • NJHMP • NJGWS • NJDEP • Steering and Planning Committee Input
Hailstorm	Yes	Yes	Please see Severe Weather	



Section 5.2: Identification of Hazards Of Concern

Hazard	Is this a hazard that may occur in Morris County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Hurricane (and other Tropical Cyclones)	Yes	Yes	Please see Severe Weather	
Ice Jam	Yes	No	<ul style="list-style-type: none"> The NJ HMP includes ice jams in the flood hazard profile and identifies it as a hazard of concern for the State. However, the Planning and Steering Committees did not identify ice jams as a hazard of concern for Morris County. Between 1780 and 2014, there have been no reports of ice jams within Morris County. Based on the lack of occurrences, ice jams are not identified as a hazard of concern for Morris County. 	<ul style="list-style-type: none"> USACE CRREL Ice Jam Database NJ HMP Steering and Planning Committee Input
Ice Storm	Yes	Yes	Please see Severe Winter Weather	
Land Subsidence	Yes	No	Please see Geological Hazards	
Landslide	Yes	No	Please see Geological Hazards	
Nor'easters	Yes	Yes	Please see Severe Winter Weather	
Severe Weather (Windstorms, Thunderstorms, Hail, Hurricanes/Tropical Storms, Lightning, and Tornadoes)	Yes	Yes	<ul style="list-style-type: none"> NJ HMP identifies thunderstorms, lightning, tornadoes, hurricanes and extreme winds as hazards of concern for New Jersey. However, the Steering and Planning Committees identified severe weather in Morris County as wind, thunderstorm, hail, hurricanes/tropical storms and tornadoes. According to FEMA, between 2010 and 2015, Morris County was included in four declarations associated with severe weather events. <ul style="list-style-type: none"> March 12 – April 15, 2010 – FEMA-DR-1897 – Severe Weathers and Flooding August 26 – September 5, 2011 – FEMA-DR-4021 – Hurricane Irene October 29, 2011 – FEMA-DR-4048 – Severe Weather October 26 – November 8, 2012 – FEMA-DR-4048 – Hurricane Sandy NOAA's NCDC storm events database indicates that Morris County was impacted by approximately 93 Severe Weather events between 2010 and 2015 causing a total of six injuries, three fatalities, and over \$850,000 in property damages. New Jersey has experienced 147 tornadoes between 1950 and 2015, with seven of those occurring in Morris County. Based on the occurrences of severe weather events and the impacts they have had on the County, and on input from the Planning and Steering Committees, severe weather has been identified as a hazard of concern for Morris County. 	<ul style="list-style-type: none"> NJ HMP NOAA – NCDC FEMA NJ OEM SPC Steering and Planning Committee Input
Severe Winter	Yes	Yes	<ul style="list-style-type: none"> The NJHMP identifies Severe Winter Weather as a hazard of concern for New 	<ul style="list-style-type: none"> NJ HMP



Section 5.2: Identification of Hazards Of Concern

Hazard	Is this a hazard that may occur in Morris County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Weather (Heavy Snow, Blizzards, Nor'Easters, Freezing Rain/Sleet, Ice Storms)			<p>Jersey and includes snow, blizzards, and ice storms. For the purpose of this HMP Update, Morris County is including blizzards, heavy snow, Nor'Easters, freezing rain/sleet, and ice storms in the severe winter weather hazard profile.</p> <ul style="list-style-type: none"> • Normal seasonal snowfall in Morris County ranges from 25.3 to 35.3 inches. • According to FEMA, between 2010 and 2015, Morris County was included in two declarations associated with Severe Winter Weather events. <ul style="list-style-type: none"> ◦ December 26-27, 2010 – FEMA-DR-1954 – Severe Winter Weather and Snowstorm ◦ October 29, 2011 – FEMA-DR-4048 – Severe Weather • NOAA-NCDC has indicated that Morris County has experienced the impacts of 72 winter storm events between 2010 and 2015. • Based on the history of occurrences and losses, and based on input from the Planning and Steering Committees, Morris County identified severe winter weather as a hazard of concern for the County. 	<ul style="list-style-type: none"> • FEMA • NOAA – NCDC Storm Database • ONJSC • Steering and Planning Committee Input
Tornado	Yes	Yes	Please see Severe Weather	
Tsunami	No	No	<ul style="list-style-type: none"> • The NJ HMP does identify tsunami as a hazard of concern for New Jersey; however, Morris County is not bounded by coastal waters. Based on the location of the County and input from the Steering and Planning Committees, tsunami is not an identified hazard of concern for Morris County. 	<ul style="list-style-type: none"> • NJ HMP • Steering and Planning Committee Input
Volcano	No	No	<ul style="list-style-type: none"> • The NJ HMP does not identify volcano as a hazard of concern for New Jersey. • There are no active volcanoes located in Morris County; therefore, the Steering and Planning Committees did not identify volcanoes as a hazard of concern for the County. 	<ul style="list-style-type: none"> • NJ HMP • Steering and Planning Committee Input
Wildfire	Yes	Yes	<ul style="list-style-type: none"> • The NJHMP identifies as wildfire as a hazard of concern for New Jersey. • In Morris County, approximately 294.2 square miles of the County are located in the low to moderate NJFFS Risk Area and 17.8 square miles is located in the high to extreme risk area. The northern area of the County has the highest risk. • Between 2010 and 2015, there have several reports of wildfires and brush fires in Morris County. • Approximately 37% of the County's population is exposed to a moderate/low risk area and 1.6% of the population is exposed to an extreme/very high/high risk area. • Based on input from the Steering and Planning Committees and the amount of land vulnerable to wildfires, wildfire is considered a hazard of concern for Morris County. 	<ul style="list-style-type: none"> • NOAA – NCDC Storm Events Query • USGS • NJ HMP • NJFFS • Steering and Planning Committee Input
Windstorm	Yes	Yes	Please see Severe Weather	



Section 5.2: Identification of Hazards Of Concern

Hazard	Is this a hazard that may occur in Morris County?	If yes, does this hazard pose a significant threat to the County?	Why was this determination made?	Source(s)
Disease Outbreak	Yes	Yes	<ul style="list-style-type: none"> The 2014 NJ HMP identifies disease outbreak as a hazard of concern for New Jersey. Infestations of ticks, mosquitoes, and/or other types of pest may be present in the county. Therefore, the Steering and Planning Committees identified disease outbreak as a hazard of concern. In addition to tick- and mosquito-borne illnesses, the county has been impacted by influenza, Hepatitis C, and foodborne illnesses, and has participated in Ebola awareness/preparedness meetings as led by the state. 	<ul style="list-style-type: none"> 2014 NJ HMP USGS NJDOH Steering and Planning Committee Input
Infestation	Yes	Yes	See Disease Outbreak	

DIR	Drought Impact Reporter
DR	Presidential Disaster Declaration Number
EM	Presidential Disaster Emergency Number
FEMA	Federal Emergency Management Agency
HMP	Hazard Mitigation Plan
K	Thousands (\$)
M	Millions (\$)
NCDC	National Oceanic and Atmospheric Administration National Climatic Data Center
NJ	New Jersey
NJDEP	New Jersey Department of Environmental Protection
NJDOH	New Jersey Department of Health
NJFFS	New Jersey Forest Fire Service
NJGS	New Jersey Geological Survey (as part of the NJDEP)
NOAA	National Oceanic and Atmospheric Administration
NRCC	Northeast Regional Climate Center
NWS	National Weather Service
OEM	Office of Emergency Management
ONJSC	Office of New Jersey State Climatologist
SPC	Storm Prediction Center
USGS	U.S. Geologic Survey



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According to input from the County, and review of all available resources, a total of nine natural hazards and three non-natural hazards of concern were identified as significant hazards affecting the entire planning area, to be addressed at the county level in this plan:

- Dam Failure
- Disease Outbreak
- Drought
- Earthquake
- Extreme Temperature
- Flood
- Geological Hazards
- Hazardous Materials
- Infestation
- Severe Weather
- Severe Winter Storm
- Wildfire

Other natural and human-caused hazards of concern have occurred within Morris County, but have a low potential to occur and/or result in significant impacts within the County. Therefore, these hazards will not be further addressed within this version of the Plan. However, if deemed necessary by the County, these hazards may be considered in future versions of the Plan.